

This listing of claims will replace all prior versions, and listings, of claims in the application:

### Listing of Claims

1. (original) A method of detecting, characterising or monitoring a hydrocarbon zone, which method comprises the genotypic analysis of a sample for the presence of one or more thermophilic or extremophilic microorganisms.
2. (currently amended) A method as claimed in claim 1 wherein the sample is from [[the]] a sub-surface formation.
3. (currently amended) A method as claimed in claim 1 ~~or claim 2~~ wherein the sample is oil, water or a oil/water mixture from an exploration or production well.
4. (currently amended) A method as claimed in ~~any preceding claim~~ claim 1 wherein the sample is oil or water that has been exposed to oil.
5. (currently amended) A method as claimed in ~~any preceding claim~~ claim 1 wherein information regarding the microorganisms present is utilised in an ongoing exploration or production process.
6. (currently amended) A method as claimed in ~~any preceding claim~~ claim 1 wherein a plurality of different microorganisms are detected thereby generating a microbiological profile for said sample.
7. (original) A method as claimed in claim 6 wherein the generated microbiological profile is compared against one or more reference profiles.

8. (currently amended) A method as claimed in ~~any preceding claim~~ claim 1 wherein the sample is analysed for the presence of Archaeoglobus, Erythrobacter, Arcobacter, Geothermobacter, Thermodesulforamonas and Thermotogales.

9. (currently amended) A method as claimed in ~~any preceding claim~~ claim 1 which does not comprise a culturing step.

10. (currently amended) A method as claimed in ~~any preceding claim~~ claim 1 wherein the sample is contacted with one or more different oligonucleotides designed to hybridise to regions of nucleic acid from or derived from the thermophilic or extremophilic microorganisms.

11. (currently amended) A method as claimed in ~~any preceding claim~~ claim 1 wherein at least some of the nucleic acid within the sample is amplified.

12. (currently amended) A method as claimed in ~~any preceding claim~~ claim 1 wherein the hydrocarbon zone is characterised such that information about the type of oil, the quantity of oil, the quality of the oil, the sulphur content of the oil, the presence of gas or the gas:oil ratio is obtained.

13. (currently amended) A method as claimed in ~~any one of claims 1 to 11~~ claim 1 wherein the hydrocarbon zone is characterized such that the depth of a hydrocarbon zone is determined, wherein the particular microorganisms identified are indicative of a certain depth.

14. (currently amended) A method as claimed in ~~any one of claims 1 to 11~~ claim 1 wherein the hydrocarbon zone is characterised such that the migration route of said hydrocarbon zone is determined.

15. (currently amended) A method as claimed in claim 13 ~~or claim 14~~ wherein the hydrocarbon zone is an oil reservoir.

16. (currently amended) A method as claimed in ~~any preceding claim~~ claim 1 wherein genotypic analysis is performed using one or more probes selected from the group consisting of ~~represented by~~ SEQ ID No. 1 to SEQ ID No. 19.

17. (currently amended) The use of one or more oligonucleotide probes preferably a battery of probes in the generation of a microbiological profile of a sample as defined in ~~any one of claims 2 to 4~~ claim 2, wherein said profile is for detecting, characterizing or monitoring a hydrocarbon zone.

18. (previously presented) The use of claim 17 wherein said microbiological profile is a pattern which can be compared with a reference sample.

19. (currently amended) A battery of probes for use in the method of ~~any one of claims 1 to 16~~ claim 1.

20. (previously presented) An oligonucleotide as defined in any one of SEQ ID No. 5 to SEQ ID No. 19 or a functionally equivalent variant thereof.

21. (previously presented) A solid support having attached thereto one or more oligonucleotides as defined in claim 20.

22. (previously presented) A solid support as claimed in claim 21 which is a microchip.

23. (currently amended) A solid support having attached thereto one or more oligonucleotides as defined any one of SEQ ID No. 5 to SEQ ID No. 19 or a functionally equivalent variant thereof ~~as claimed in claim 21 or 22 which, wherein the solid support~~ has at least 4 oligonucleotides ~~as defined in claim 20~~ attached thereto.

24. (currently amended) A kit for use in a method as claimed in ~~any one of claims 1 to 16~~ claim 1 comprising one or more oligonucleotides as defined in any one of SEQ ID No. 5 to SEQ ID No. 19 or a functionally equivalent variant thereof ~~claim 20~~.